

**WE CLAIM AS OUR INVENTION:**

1. A gradient coil system for a magnetic resonance apparatus having an area adapted to receive an examination subject, comprising:

at least one gradient coil with a conductor arrangement for generating a magnetic gradient field having a main field component that is collinear to a basic magnetic field and at least one accompanying field component that is perpendicular to the main field component; and

at least one further conductor arrangement for feeding electrical current and which is fashioned and arranged for generating a non-homogeneous magnetic field such that the main field component is approximately unaltered at least in said area and such that the accompanying field component is reduced.

2. A gradient coil system according to claim 1, wherein the conductor arrangement of the gradient coil has at least one conductor section with a longitudinal course having a component parallel to the basic magnetic field and the further conductor arrangement comprises at least one conductor section, which is allocated to the conductor section of the gradient coil, having a longitudinal course oriented approximately parallel relative to the basic magnetic field and which can be operated with an opposite current direction relative to a current direction in the conductor section of the gradient coil.

3. A gradient coil system according to claim 2 wherein the conductor section of the further conductor arrangement is approximately parallel to the conductor section of the gradient coil.

4. A gradient coil system according to claim 2 wherein the conductor sections are arranged tightly adjacent.

5. A gradient coil system according to claim 2 wherein one of the conductor sections coaxially encloses the other one.

6. A gradient coil system according to claim 1 wherein the conductor arrangements are adapted for respectively guiding approximately equal current intensities.

7. A gradient coil system according to claim 1 wherein the gradient coil has at least one saddle shaped sub-coil.

8. A gradient coil system according to claim 1 wherein the further conductor arrangement comprises at least one conductor section of a conductor arrangement of a shielding coil for the gradient coil.

9. A gradient coil system according to claim 8 wherein the shielding coil comprises at least one saddle shaped sub-coil.

10. A gradient coil system according to claim 1 wherein the gradient coil and the conductor arrangement approximately form a hollow cylinder having a hollow cylinder principal axis oriented parallel to the basic magnetic field.

11. A gradient coil system according to claim 10, wherein the conductor arrangement of the gradient coil has conductor sections which are respectively at differently radial distances relative to the hollow cylinder principal axis.

12. A gradient coil system according to claim 10 wherein the further conductor arrangement has conductor sections which are respectively different radial distance relative to the hollow cylinder principal axis.

13. A gradient coil system according to claim 10 wherein the conductor arrangement of the gradient coil has at least one conductor section with a longitudinal course path having a component parallel to the hollow cylinder principal axis, the further conductor arrangement has at least one conductor section approximately parallel to the conductor section of the gradient coil, and the conductor section of the gradient coil is disposed a greater distance from the hollow cylinder principal axis than the conductor section of the further conductor arrangement.

10025057 121801